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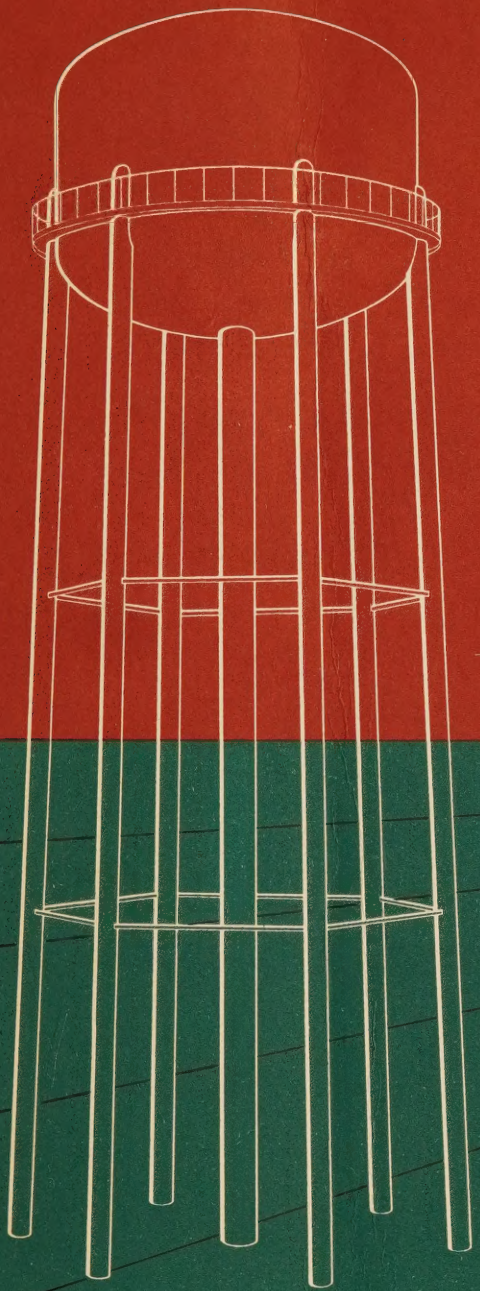
HORTON

ELLIPSOIDAL BOTTOM ELEVATED STEEL TANKS of Welded Construction



CHICAGO BRIDGE & IRON COMPANY

Welded Construction

The Horton elevated steel tanks illustrated in this bulletin are of modern, welded construction. They are graceful, streamline structures with cylindrical columns and ellipsoidal roofs and bottoms.

The columns and struts are fabricated from steel plates. They are hermetically sealed to keep out air and moisture, and thus prevent corrosion on the inside.

Horton welded elevated tanks are economical to maintain. Butt welded construction results in smooth surfaces that can be painted easily, giving the steel lasting protection and long life.

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Utilize Force of Gravity

Horton elevated steel tanks are used to provide dependable gravity pressure in municipal water systems and in private water systems supplying factories, schools, estates, golf clubs and public institutions.

Maintain Uniform Pressure

The water in an elevated tank flows into the system by the force of gravity alone. The head provided by the tank will maintain a uniform pressure in the mains during periods when pumps are shut down or are temporarily out of service due to power failure, mechanical difficulty or other emergency.

Meet Peak Loads

Elevated tanks provide an economical means of meeting peak loads in water systems, especially when there are wide variations between minimum and maximum rates of use. With elevated storage, the wells or water intakes, pumping equipment, filtration units, and transmission mains can be designed to take care of average needs and the reserve in the tank used to provide the additional water needed during peak periods.

Welded Ellipsoidal-bottom Elevated Steel Tank

4 POST ☆ 2 PANEL

Reduce Pumping Costs

In small water systems with elevated tanks, the pumps are usually operated until the tanks are filled and then shut down. In large systems, pumping equipment is usually operated constantly at a uniform, average rate. When more water is being pumped than used, the surplus goes into the tank. When the consumption of water exceeds the pumping rate, the difference flows into the system, by gravity, from the tank. Under both methods, the pumps operate at their rated capacity, which results in maximum efficiency.

In some instances, the operators of waterworks systems have reduced pumping costs materially by installing sufficient elevated storage capacity to discontinue all pumping during periods when the peak electric load is on the power plant. Power companies will usually allow a lower rate if no pumping is done during their residential and industrial peak electric load periods. The savings are even more marked if all pumping is done at off-peak periods when power is supplied by a municipally-owned plant. The capacity of the power plant—and the investment in it—can be smaller and the cost of generating power used for pumping is low on account of its being produced entirely by surplus power plant capacity at off-peak periods.

Elevated storage is also used to reduce pumping costs by keeping the maximum rate at which power is used for pumping below a specified limit, and thus avoid demand charges.

Welded Ellipsoidal-bottom Elevated Steel Tank

6 POST ☆ 2 PANEL

Increases Capacity of System

The installation of adequate water storage capacity and its proper location often makes it possible to utilize the mains in a water distribution system more efficiently and, in effect, increase their capacity. For example, tanks in outlying sections of large systems can be filled from the existing mains during off peak periods. Normally the mains in a water system have sufficient capacity to supply the water used by consumers during off peak periods and, at the same time, feed through enough water needed to fill outlying tanks.

When the next peak period comes on, the water sent through the system to storage flows back into the mains to provide all of the needs in the area served by the tank. This leaves the total capacity of the transmission or arterial mains free to supply intermediate areas direct from the pumping station.

If there are areas of heavy demand between the pumping station and outlying tanks, water feeding back into the system from storage also serves the heavy demand area, doubling or tripling the capacity of the mains serving that area.

Location of Elevated Tanks

In small water distribution systems, elevated tanks are usually located on one side of the business section, or area of greatest demand, and the pumping plant on the other side. This assures the area of greatest demand being served from two directions at peak load periods.

Welded Ellipsoidal-bottom Elevated Steel Tank

4 POST ☆ 3 PANEL

Distributed Storage

In medium size or large cities, it is often advantageous to install several tanks at different locations in preference to a single tank with the same total storage capacity. When this is done, each tank is located near the center of an area of heavy demand and should have sufficient capacity to supply the peak loads in that area.

Water systems serving hilly areas with a wide range in elevation are often operated in sections or districts. When this is done, it is necessary to install one or more tanks in each independently operated section in order to obtain the maximum benefits of elevated storage.

Fire Flow Requirements

Elevated water tanks are usually built with sufficient capacity to meet normal operating demands plus a reserve for fire flow in accordance with the recommndations of the National Board of Fire Underwriters. This reserve, which is always available under dependable gravity pressure, materially reduces the danger of the loss of life or the destruction of property by fire. The provision of a reserve for fire flow, together with the proper mains, hydrants and fire fighting equipment, usually improves the classification issued by the local insurance rating bureau. This, in turn, reduces the premiums of all insurance carried on property in the area served by the system. The total annual saving thus effected is considerable.

Welded Ellipsoidal-bottom Elevated Steel Tank

6 POST ☆ 3 PANEL

For Industrial Service

Elevated steel tanks are often used to provide dependable water pressure for general service at industrial plants. The water supply for installations of this type may be obtained from a private source, such as wells, or from the mains of the public water system. A private gravity water supply is particularly desirable where water shortages are likely to interrupt production or cause damage to equipment.

For Fire Protection

Automatic sprinkler systems normally have two or more independent water supplies. The "primary" supply maintains pressure in the system at all times and the "secondary" supply supplements it.

The primary supply should be capable of delivering at least 500 gallons per minute. In large plants and in plants where the buildings are of wooden construction or the products manufactured are highly combustible, up to 2,000 gallons per minute, or more in case of special hazards, may be required. The secondary supply must be adequate to maintain protection when the primary supply is crippled or when it becomes overtaxed or exhausted during a fire.

Elevated steel tanks are used to provide primary supplies for automatic sprinkler systems when public water systems are not available or are inadequate. Where a public water system can deliver a sufficient volume of water at satisfactory pressure to serve as the primary supply, an elevated steel tank is often used to provide the secondary supply.

Dual Service

Elevated water tanks at industrial plants may be piped so that the upper portion of the tank capacity can be used for general service and the lower portion reserved for fire protection. When this is done, a separate domestic service line is installed which cannot draw water from the tank below a predetermined level. The remainder of the tank capacity can be drawn out only through the tank riser, which is attached to automatic sprinklers or hydrants.

Welded Ellipsoidal-bottom Elevated Steel Tank

8 POST ☆ 3 PANEL

Gravity Pressure Is Dependable

An automatic sprinkler system with a gravity water supply provides dependable fire protection. The elevated tank holds a reserve of water above the property it protects, ready to flow the instant a sprinkler head opens.

Automatic sprinklers quench fires before they have a chance to gain headway. This is particularly important at night and at other times when employees are not present to discover and extinguish fires.

Guard Against Loss

The prevention of destructive fires guards against both tangible and intangible losses. It is difficult to provide insurance that will completely replace fire damage to a plant, equipment or material on hand. Fire prevention also eliminates such intangibles as loss of customers and customer good will due to failure to deliver, loss of profits on business that cannot be done and loss of experienced employees to competitors during periods of shut down.

Reduces Insurance Costs

Fire protection facilities have a decided effect on fire insurance rates. When an automatic sprinkler system with a gravity water supply is installed in an approved manner, the savings due to reduced premiums will usually pay for the installation in a few years. Any further savings, which can be considerable in high value plants, storage warehouses, etc., are clear profit.

Welded Ellipsoidal-bottom Elevated Steel Tank

4 POST ⩓ 4 PANEL

Standard Sizes

Horton ellipsoidal-bottom elevated steel tanks of welded construction are built in the standard capacities from 50,000 to 500,000 gallons. We also build ellipsoidal-bottom tanks with angle columns from 15,000 to 40,000 gallons capacity, hemispherical-bottom tanks from 5,000 to 500,000 gallons capacity, radial-cone bottom tanks from 500,000 to 2,000,000 gallons or larger and special designs such as spheroidal tanks and Waterspheres. Angle column tanks are built in standard panel heights and all other sizes may be any height desired.

Installations for municipal service are built in accordance with the American Water Works Association specifications, while those providing gravity pressure for automatic sprinkler systems meet the requirements of either the National Board of Fire Underwriters, the Inspection Department of the Associated Factory Mutual Fire Insurance Companies or the Factory Insurance Association, as required.

Standard Accessories

Municipal tank installations, unless otherwise specified, are furnished with foot elbow; inlet and outlet connection; manhole in the bottom of the riser; ladder on column, tank shell and roof; balcony; roof hatch; stub overflow; and a combination finial and vent. A circular girder in place of a balcony is optional.

In addition to the above mentioned accessories, sprinkler tank installations require fixed ladders on the inside of the shell and riser and a heating arrangement if located in a climate subject to freezing temperatures.

Anchor bolts and foundation plans based on 4,000 lbs. per sq. in. are furnished for all installations upon receipt of formal order.

Painting

Tanks for municipal service are usually painted a light color to give them a pleasing appearance. Specifications for sprinkler tanks ordinarily call for a black or dark green paint due to their being located in manufacturing districts. They can, however, be painted a light color and when this is desired, the type and color of paint to be used should be set forth clearly in the specifications.

Data Required for Quotations

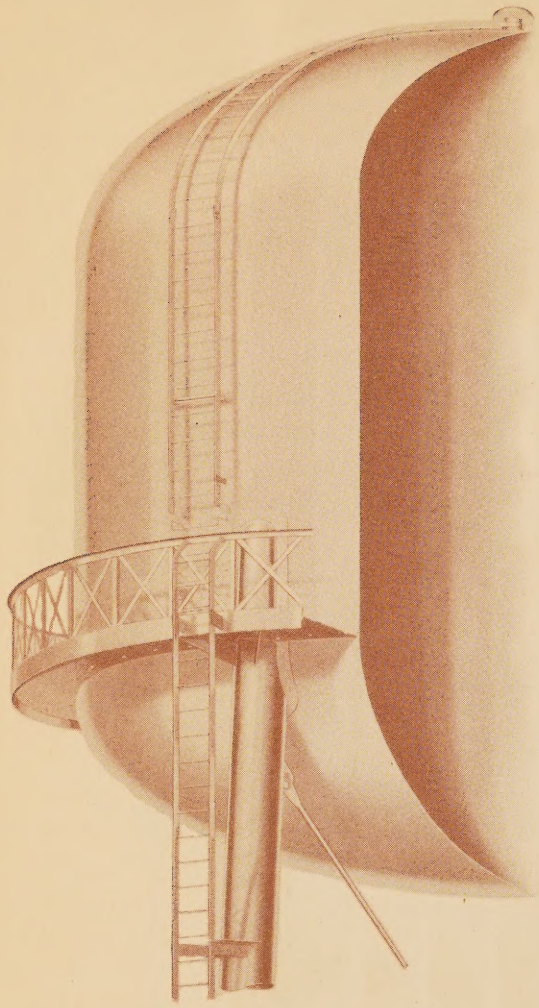
When requesting estimating figures or quotations on elevated tanks for municipal service, please state capacity, height to bottom (or to high water line) and location.

For sprinkler installations, give location, governing insurance specifications, capacity, height to bottom, type of paint, and steam pressure available for heating tank.

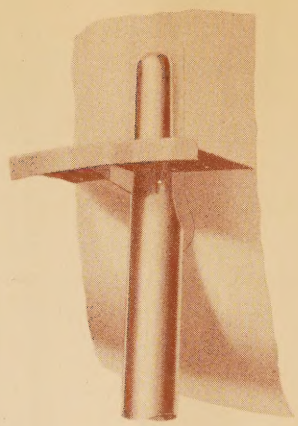
NOTE: The type of paint, piping connections, heater if required and other accessories furnished on each installation are set forth clearly in each quotation.

Welded Ellipsoidal-bottom Elevated Steel Tank

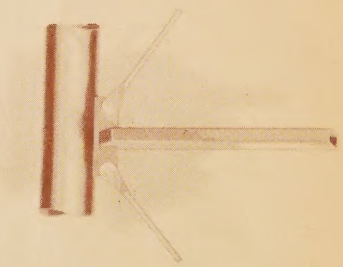
6 POST ☆ 4 PANEL



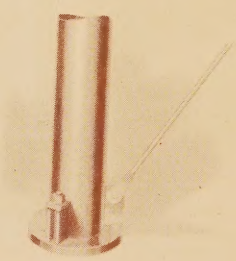
Revolving ladder on tank shell and roof, fixed ladder on column, balcony, and top diagonal rod connection to column.



Column and shell connection.



Diagonal rod and strut connection to cylindrical columns.



Column base, anchor and bottom diagonal rod connection.

Welded Ellipsoidal-bottom Elevated Tank Details

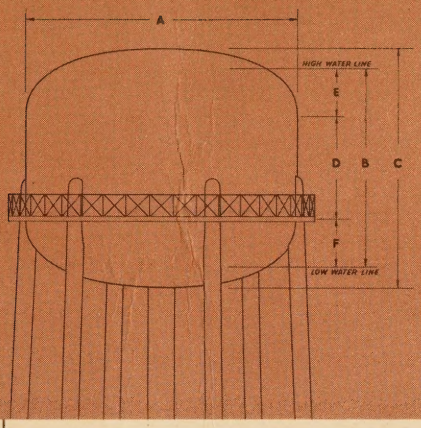


Table of Standard Capacities for WELDED ELLIPSOIDAL-BOTTOM ELEVATED TANKS

Capacity in U. S. Gallons	TANK DIMENSIONS							
	Diameter of Tank A	Range in Head B	Overall Depth of Tank C	Vertical Shell Height D	Top of Vertical Shell to High Water Line E	Bottom of Vertical Shell to Low Water Line F	Number of Columns	Size of Columns
15,000	15′-6″	11′-0″	14′-9″	7′-0″	2′-0″	2′-0″	4	6″x6″ Angle
20,000	15′-6″	14′-9″	18′-0″	10′-3″	2′-3″	2′-3″	4	6″x6″ Angle
25,000	18′-0″	14′-0″	18′-0″	9′-0″	2′-6″	2′-6″	4	8″x8″ Angle
30,000	18′-0″	16′-0″	20′-0″	11′-0″	2′-6″	2′-6″	4	8″x8″ Angle
40,000	20′-0″	18′-0″	22′-0″	12′-0″	3′-0″	3′-0″	4	16″ Diam.
50,000	22′-0″	19′-0″	22′-0″	11′-0″	4′-0″	4′-0″	4	16″ Diam.
60,000	24′-0″	19′-0″	23′-0″	11′-0″	4′-0″	4′-0″	4	16″ Diam.
75,000	26′-0″	21′-0″	24′-0″	11′-0″	5′-0″	5′-0″	4	16″ Diam.
100,000	28′-0″	24′-0″	28′-0″	14′-0″	5′-0″	5′-0″	4	22″ Diam.
125,000	30′-0″	25′-6″	30′-0″	15′-0″	5′-3″	5′-3″	4	22″ Diam.
150,000	32′-0″	27′-6″	31′-0″	15′-0″	6′-3″	6′-3″	6	22″ Diam.
200,000	36′-0″	29′-6″	33′-0″	15′-0″	7′-3″	7′-3″	6	22″ Diam.
250,000	40′-0″	29′-0″	35′-0″	15′-0″	7′-0″	7′-0″	6	30″ Diam.
300,000	43′-0″	30′-0″	37′-0″	15′-6″	7′-3″	7′-3″	6	30″ Diam.
400,000	46′-0″	35′-0″	42′-0″	19′-0″	8′-0″	8′-0″	8	30″ Diam.
400,000	50′-0″	30′-0″	38′-0″	13′-0″	8′-6″	8′-6″	8	30″ Diam.
500,000	50′-0″	37′-6″	44′-0″	19′-0″	9′-3″	9′-3″	8	30″ Diam.
500,000	56′-0″	30′-0″	39′-4″	11′-4″	9′-4″	9′-4″	8	30″ Diam.

NOTES: Welded ellipsoidal-bottom elevated tanks of 15,000 to 30,000 gallons capacity inclusive are furnished with bolted angle post towers. 15,000 and 20,000 gallon sizes have standard 10 foot panels. 25,000 and 30,000 gallon sizes have standard 12½ foot panels.

Capacities of 40,000 gallons and over are built with welded cylindrical columns, any height to bottom desired.

The low water line is from 18 to 56 inches above the actual bottom of the tank and the water below this line is not included in the designated capacity of the tank.

The height to bottom is figured to the low water line on all installations.